

SEQUENCE LISTING

<110> Downie, Bruce
Zhao, Tian-Yong
Meeley, Robert
Bradford, Kent

<120> Stress Responsive Genes, Regulatory Elements, and Methods of Use for Same

<130> RTS4647

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<170> PatentIn version 3.0

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Arg Lys Val Gly Ser Ala Tyr Pro Leu Val Val Ala Leu Leu Pro Asp
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Arg Glu Ile Glu Pro Val Tyr Pro Pro Glu Asn Gln Thr Gln Phe Ala
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Met Ala Tyr Tyr Val Ile Asn Tyr Ser Lys Leu Arg Ile Trp Glu Phe
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Tyr Val Thr Ala Pro Ser Ala Ala
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Lys Val Val His Tyr Cys Ala Ala Gly Ser Lys Pro Trp Arg Phe Thr
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Gly Lys Glu Ala Asn Met Asp Arg Glu Asp Ile Lys Ser Leu Val Asn
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Lys Trp Trp Asp Ile Tyr Asn Asp Glu Ser Leu Asp Phe Lys Gly Leu
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Pro Leu Ser Pro Ala Asp Ala Asp Ala Asp Asp Glu Val Glu Ala Val
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Pro Glu Leu Met Thr Ala Lys Met Thr Ala Asn Ala Ala Ala Ala Ala
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gcg gcg gcg gcg gcg gcg aag cct gcc acg agg gcg tac gtg acg ttc      212
Ala Ala Ala Ala Ala Ala Lys Pro Ala Thr Arg Ala Tyr Val Thr Phe
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Leu Ala Gly Asp Gly Asp Tyr Trp Lys Gly Val Val Gly Leu Ala Lys
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Gly Leu Arg Lys Val Arg Ser Ala Tyr Pro Leu Val Val Ala Val Leu
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Glu Phe Val Glu Tyr Glu Arg Met Val Tyr Leu Asp Ala Asp Ile Gln
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ccc gaa acc ctc cgg ttg att ccg cca acc ccc ttc gca aag aag gac	788
Pro Glu Thr Leu Arg Leu Ile Pro Pro Thr Pro Phe Ala Lys Lys Asp	
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Phe Leu Lys Met Phe Phe Arg Asp Asn Tyr Arg Pro Ile Pro Asn Val	
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Tyr Asn Leu Val Leu Ala Met Leu Trp Arg His Pro Glu Asn Val Gln	
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ctg gag aag gtg aag gtc gtg cat tat tgc gcg gcg ggg tcc aag ccg	932
Leu Glu Lys Val Lys Val Val His Tyr Cys Ala Ala Gly Ser Lys Pro	
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Trp Arg Phe Thr Gly Lys Glu Ala Asn Met Asp Arg Glu Asp Ile Asn	
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Ala Leu Val Lys Lys Trp Trp Asp Ile Tyr Asn Asp Glu Thr Leu Asp	
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Arg Cys Pro Arg Ser Arg Phe Ala Arg Pro Trp Arg Arg Pro Ala Arg	
325 330 335	
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Ser Lys Tyr Val Thr Ala Pro Ser Ala Ala	
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 35 40 45

Ala Lys Gly Leu Arg Lys Val Arg Ser Ala Tyr Pro Leu Val Val Ala
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Val Leu Pro Asp Val Pro Glu Ser His Arg Arg Ile Leu Val Ser Gln
 65 70 75 80

Gly Cys Val Val Arg Glu Ile Glu Pro Val Tyr Pro Pro Glu Asn Gln
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Thr Gln Phe Ala Met Ala Tyr Tyr Val Ile Asn Tyr Ser Lys Leu Arg
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Ile Trp Glu Phe Val Glu Tyr Glu Arg Met Val Tyr Leu Asp Ala Asp
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Ala Trp Pro Thr Arg Thr Ala Glu Leu Gly Leu Pro Pro Ser Ser Tyr
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Phe Asn Ala Gly Met Phe Leu Lys Glu Pro Asn Leu Ala Thr Ala Lys
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Gly Ser Pro Glu Thr Leu Arg Leu Ile Pro Pro Thr Pro Phe Ala Lys
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Lys Asp Phe Leu Lys Met Phe Phe Arg Asp Asn Tyr Arg Pro Ile Pro
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Asn Val Tyr Asn Leu Val Leu Ala Met Leu Trp Arg His Pro Glu Asn
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Val Gln Leu Glu Lys Val Lys Val Val His Tyr Cys Ala Ala Gly Ser
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Lys Pro Trp Arg Phe Thr Gly Lys Glu Ala Asn Met Asp Arg Glu Asp
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Ile Asn Ala Leu Val Lys Lys Trp Trp Asp Ile Tyr Asn Asp Glu Thr
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Leu Asp Leu Lys Gly Cys Leu Ala Ser Arg Pro Thr Thr Thr Thr Arg
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Phe	Leu	Ala	Gly	Asp	Gly	Asp	Tyr	Trp	Lys	Gly	Val	Val	Gly	Leu	Ala	
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Lys	Gly	Leu	Arg	Lys	Val	Arg	Ser	Ala	Tyr	Pro	Leu	Val	Val	Ala	Val	
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ctg	ccc	gac	gtg	ccc	gag	tcc	cac	cgc	cgc	atc	ctc	gtc	tcg	cag	ggc	362
Leu	Pro	Asp	Val	Pro	Glu	Ser	His	Arg	Arg	Ile	Leu	Val	Ser	Gln	Gly	
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tgc	gtc	gtc	cgc	gag	atc	gag	ccc	gtg	tac	ccg	cct	gag	aac	cag	acg	410
Cys	Val	Val	Arg	Glu	Ile	Glu	Pro	Val	Tyr	Pro	Pro	Glu	Asn	Gln	Thr	
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cag	ttc	gcc	atg	gcg	tac	tac	gtc	atc	aac	tac	tcc	aag	ctc	cgc	atc	458
Gln	Phe	Ala	Met	Ala	Tyr	Tyr	Val	Ile	Asn	Tyr	Ser	Lys	Leu	Arg	Ile	
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Trp	Glu	Phe	Val	Glu	Tyr	Glu	Arg	Met	Val	Tyr	Leu	Asp	Ala	Asp	Ile	
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cag	gtg	ttc	gag	aac	atc	gac	ggc	ctg	ttc	gag	ctc	gag	aag	ggg	tac	554
Gln	Val	Phe	Glu	Asn	Ile	Asp	Gly	Leu	Phe	Glu	Leu	Glu	Lys	Gly	Tyr	
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Phe	Tyr	Ala	Val	Met	Asp	Cys	Phe	Cys	Glu	Lys	Thr	Trp	Ser	His	Thr	
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Asn	Ala	Gly	Met	Phe	Val	His	Glu	Pro	Ser	Val	Ala	Thr	Ala	Lys	Ala	
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ctc	ctc	gac	acc	ctc	cgc	gtg	act	ccg	ccc	acc	ccc	ttc	gca	gag	cag	794
Leu	Leu	Asp	Thr	Leu	Arg	Val	Thr	Pro	Pro	Thr	Pro	Phe	Ala	Glu	Gln	
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Pro Trp Arg Phe Thr Gly Lys Glu Ala Asn Met Asp Arg Glu Asp Ile			
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Asn Ala Leu Val Asn Lys Trp Trp Asp Ile Tyr Asn Asp Glu Thr Leu			
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Asp Leu Lys Gly Leu Pro Ser Leu Ser Pro Asp Asp Asp Asp Glu Val			
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Glu Ala Val Ala Lys Lys Pro Leu Arg Ala Ala Leu Ala Glu Ala Gly			
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Asp Val Pro Glu Ser His Arg Arg Ile Leu Val Ser Gln Gly Cys Val
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Val Arg Glu Ile Glu Pro Val Tyr Pro Pro Glu Asn Gln Thr Gln Phe
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Ala Val Met Asp Cys Phe Cys Glu Lys Thr Trp Ser His Thr Pro Gln
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Gly Met Phe Val His Glu Pro Ser Val Ala Thr Ala Lys Ala Leu Leu
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Asp Thr Leu Arg Val Thr Pro Pro Thr Pro Phe Ala Glu Gln Asp Phe
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Leu Asn Met Phe Phe Arg Asp Gln Tyr Arg Pro Ile Pro Asn Val Tyr
 225 230 235 240

Asn Leu Val Leu Ala Met Leu Trp Arg His Pro Glu Asn Val Gln Leu
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Glu Lys Val Lys Val Val His Tyr Cys Ala Ala Gly Ser Lys Pro Trp
 260 265 270

Arg Phe Thr Gly Lys Glu Ala Asn Met Asp Arg Glu Asp Ile Asn Ala
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Leu Val Asn Lys Trp Trp Asp Ile Tyr Asn Asp Glu Thr Leu Asp Leu
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Lys Gly Leu Pro Ser Leu Ser Pro Asp Asp Asp Asp Glu Val Glu Ala
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 Gly Arg Leu Val Ala His Gly Arg Ser Val Leu Ala Gly Val Pro Asp
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 Asn Ile Val Leu Thr His Ala Ser Gly Ala Gly Leu Val Asp Gly Ala
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 Phe Val Gly Ala Thr Ala Ala Glu Pro Ser Ser Met His Val Phe Thr
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 Phe Gly Thr Leu Arg Asp Leu Arg Phe Val Cys Cys Phe Arg Phe Lys
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gcg	gcg	gcg	tac	gtg	gcg	atg	ctg	ccg	ctg	ctg	gag	ggc	cag	ttc	cgg		568
Ala	Ala	Ala	Tyr	Val	Ala	Met	Leu	Pro	Leu	Leu	Glu	Gly	Gln	Phe	Arg		
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gcg	gcg	ctg	cag	ggc	aac	gac	cgc	gac	gag	ctg	gag	atc	acc	ttc	gag		616
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Ser	Gly	Asp	Lys	Ala	Val	Gln	Thr	Ala	His	Gly	Thr	Cys	Met	Leu	Tyr		
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Leu	Pro	Ser	Phe	Val	Asp	Trp	Phe	Gly	Trp	Cys	Thr	Trp	Asp	Ala	Phe		
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Gln	Gln	Ile	Gly	Ser	Glu	Asn	Lys	Glu	Glu	Ser	Ala	Asn	Ala	Val	Val		
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Lys	Phe	Gln	Lys	Lys	Thr	Lys	Thr	Lys	Glu	Ser	Gly	Gly	Gly	Gly	Gly		
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Glu	Gln	Gln	Ala	Gln	Thr	Pro	Gly	Leu	Lys	Leu	Leu	Val	Glu	Glu	Ala		
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Lys	Arg	Glu	His	Gly	Val	Arg	Tyr	Val	Tyr	Val	Trp	His	Ala	Met	Ala		

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Gly Tyr Trp Gly Gly Val Lys Pro Ala Ala Glu Gly Met Glu His Tyr							
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Glu Ser Ala Leu Ala Tyr Pro Val Gln Ser Pro Gly Val Met Gly Asn							
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cag ccg gac atc gtc atg gac tct ctg tcc gtg ctg ggc ctg ggg ctg							1288
Gln Pro Asp Ile Val Met Asp Ser Leu Ser Val Leu Gly Leu Gly Leu							
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Val His Pro Arg Arg Ala Leu Ser Phe Tyr Asp Glu Leu His Ser Tyr							
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ctc gcc tcc tgc ggc gtc gat ggc gtc aag gtg gac gtg cag aac atc							1384
Leu Ala Ser Cys Gly Val Asp Gly Val Lys Val Asp Val Gln Asn Ile							
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atc gag acg ctc ggc gcc ggg cac ggc ggc cgg gtc gcg ctc acc cgc							1432
Ile Glu Thr Leu Gly Ala Gly His Gly Gly Arg Val Ala Leu Thr Arg							
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Ala Tyr His Arg Ala Leu Glu Asp Ser Val Ala Arg Asn Phe Pro Asp							
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Asn Gly Cys Ile Ser Cys Met Cys His Asn Thr Asp Met Leu Tyr Ser							
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Asp Pro Ala Ser His Thr Val His Val Ser Ser Val Ala Tyr Asn Thr							
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ctc ttc ctc ggc gag ttc atg cag ccc gac tgg gac atg ttc cat agc							1672
Leu Phe Leu Gly Glu Phe Met Gln Pro Asp Trp Asp Met Phe His Ser							
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Leu His Pro Ala Ala Asp Tyr His Gly Ala Ala Arg Ala Ile Gly Gly							
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tgc ccg ata tac gtc agc gac aag cca ggc aac cac aac ttc gag ctg							1768
Cys Pro Ile Tyr Val Ser Asp Lys Pro Gly Asn His Asn Phe Glu Leu							
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ctc aag aag ctg gtg ctc ccc gac ggc tcc gtg ctc cgc gcg cag ctc							1816
Leu Lys Lys Leu Val Leu Pro Asp Gly Ser Val Leu Arg Ala Gln Leu							
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ccg ggc cgc ccc acc cgc gat tgc ctc ttc gcc gac ccg gcg cgc gac Pro Gly Arg Pro Thr Arg Asp Cys Leu Phe Ala Asp Pro Ala Arg Asp 540 545 550 555	1864
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 Ala Ala Glu Pro Ser Ser Met His Val Phe Thr Phe Gly Thr Leu Arg
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 Asp Leu Arg Phe Val Cys Cys Phe Arg Phe Lys Leu Trp Trp Met Thr
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 Met Leu Leu Glu Cys Gly Pro Gly Asp Gly Asp Ala Ala Ala Tyr Val
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 Val Gln Thr Ala His Gly Thr Cys Met Leu Tyr Val His Ala Gly Thr
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 Asn Pro Phe Asp Thr Ile Thr Gln Ala Val Lys Val Val Glu Arg His
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 Pro Pro Arg Phe Leu Ile Ile Asp Asp Gly Trp Gln Gln Ile Gly Ser
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 Ala Ser Arg Leu Thr Gly Ile Lys Glu Asn Ala Lys Phe Gln Lys Lys

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Phe	Met	Gln	Pro	Asp	Trp	Asp	Met	Phe	His	Ser	Leu	His	Pro	Ala	Ala
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Asp Tyr His Gly Ala Ala Arg Ala Ile Gly Gly Cys Pro Ile Tyr Val
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Ser Asp Lys Pro Gly Asn His Asn Phe Glu Leu Leu Lys Lys Leu Val
515 520 525

Leu Pro Asp Gly Ser Val Leu Arg Ala Gln Leu Pro Gly Arg Pro Thr
530 535 540

Arg Asp Cys Leu Phe Ala Asp Pro Ala Arg Asp Gly Thr Ser Leu Leu
545 550 555 560

Lys Ile Trp Asn Val Asn Lys Cys Thr Gly Val Val Gly Val Phe Asn
565 570 575

Cys Gln Gly Ala Gly Trp Cys Arg Val Thr Lys Lys Thr Arg Val His
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Asp Ala Ala Pro Gly Thr Leu Thr Gly Ser Val Arg Ala Asp Asp Val
595 600 605

Asp Val Ile Ala Gly Leu Ala Gly Asp Gly Trp Gly Gly Glu Ala Val
610 615 620

Val Tyr Ala Tyr Arg Ser Gly Glu Leu Val Arg Leu Pro Gln Gly Ala
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Thr Leu Pro Val Thr Leu Lys Val Leu Glu Phe Glu Val Phe His Val
645 650 655

Ser Pro Val Arg Ala Val Ala Pro Gly Val Ser Phe Ala Pro Ile Gly
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Asn Leu Thr Val Cys Gly Arg Thr Val Leu Ser Gly Val Pro Asp Ala
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Val Val Ala Thr Ser Ala Ala Thr Glu Gly Ala Val Asp Gly Ile Phe
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Leu Gly Ala Asp Phe Ala Glu Pro Ala Ala Arg His Val Val Ser Leu
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Gly Asp Leu Arg Asp Val Arg Phe Met Ala Cys Phe Arg Phe Lys Leu
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tgg tgg atg gcg cag cgg atg ggg gag aaa ggc agc gac gtc ccg cgc      710
Trp Trp Met Ala Gln Arg Met Gly Glu Lys Gly Ser Asp Val Pro Arg
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Ala Ala Tyr Val Val Phe Leu Pro Leu Val Glu Gly Ala Phe Arg Ala
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Ser Ile Gln Gly Gly Ala Gly Asp Ala Leu Glu Leu Cys Val Glu Ser
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Gly Ala Ala Glu Ser Asp Pro Phe Ala Ala Ile Ser Gly Ala Val Ala	
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Tyr Gln Asp Val Thr Gln Glu Gly Val Glu Ala Gly Leu Arg Ser Leu	
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Met Gln Phe Pro Lys Val Ser Pro Gly Val Met Glu Asn Glu Pro Gly	
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Met Lys Thr Asp Val Leu Thr Val Gln Gly Leu Gly Leu Val His Pro	
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Phe Ala Glu Pro Ala Ala Arg His Val Val Ser Leu Gly Asp Leu Arg
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Asp Val Arg Phe Met Ala Cys Phe Arg Phe Lys Leu Trp Trp Met Ala
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Gln Arg Met Gly Glu Lys Gly Ser Asp Val Pro Arg Glu Thr Gln Phe
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Leu Leu Val Glu Ser Arg Gly Val Gly Asp Glu Asp Ala Ala Tyr Val
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Val Phe Leu Pro Leu Val Glu Gly Ala Phe Arg Ala Ser Ile Gln Gly
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Gly Ala Gly Asp Ala Leu Glu Leu Cys Val Glu Ser Gly Asp Asp Asp
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Thr Arg Ala Ala Ser Phe Glu Arg Ser Leu Phe Val Gly Ala Ala Glu
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Ser Asp Pro Phe Ala Ala Ile Ser Gly Ala Val Ala Ala Ala Lys Ser
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Ala Leu Arg Thr Phe Arg Val Arg Ala Glu Lys Lys Leu Pro Gly Ile
180 185 190

Val Asp Tyr Phe Gly Trp Cys Thr Trp Asp Ala Phe Tyr Gln Asp Val
195 200 205

Thr Gln Glu Gly Val Glu Ala Gly Leu Arg Ser Leu Ile Ala Gly Gly
210 215 220

Ala Pro Pro Lys Phe Val Ile Ile Asp Asp Gly Trp Gln Ser Val Ala
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Thr Asp Thr Asn Glu Ser Ala Gly Glu Asp Lys Pro Pro Leu Leu Ser
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Arg Leu Thr Gly Ile Lys Glu Asn Ser Lys Phe Gln Asn Ala Asp Asp
260 265 270

Pro Ala Ala Gly Ile Lys Thr Val Val Arg Leu Ala Lys Glu Glu Tyr
275 280 285

Arg Leu Lys Tyr Val Tyr Val Trp His Ala Ile Thr Gly Tyr Trp Gly
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Lys Val Ser Pro Gly Val Met Glu Asn Glu Pro Gly Met Lys Thr Asp
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Val Leu Thr Val Gln Gly Leu Gly Leu Val His Pro Arg Ala Val Tyr
340 345 350

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Ala	Gly	Ile	Ala	Val	Gln	Asp	Gly	Ser	Leu	Leu	Ala	Leu	Gly	Ala	Lys			
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Glu	Leu	Glu	Ile	Cys	Leu	Glu	Ser	Gly	Asp	Pro	Asp	Val	Glu	Ser	Phe			
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caa	ggc	tcc	cat	ctg	gtc	ttc	gtt	ggc	gcc	gga	tcg	gac	ccg	ttc	gag			595
Gln	Gly	Ser	His	Leu	Val	Phe	Val	Gly	Ala	Gly	Ser	Asp	Pro	Phe	Glu			
	150					155					160							

gtc atc aca agt tca gtc aag gct gtc gag agg cac ttg cag acg ttc Val Ile Thr Ser Ser Val Lys Ala Val Glu Arg His Leu Gln Thr Phe 165 170 175 180	643
tct cac agg gag aag aaa aag atg cca gac att ctg aac tgg ttt ggc Ser His Arg Glu Lys Lys Lys Met Pro Asp Ile Leu Asn Trp Phe Gly 185 190 195	691
tgg tgc acg tgg gac gcg ttc tac acc aat gtc aac gcc cag gga gtg Trp Cys Thr Trp Asp Ala Phe Tyr Thr Asn Val Asn Ala Gln Gly Val 200 205 210	739
aag caa gga ttg cag agc ttg gaa aaa ggc ggg gtc tct cct agg ttc Lys Gln Gly Leu Gln Ser Leu Glu Lys Gly Gly Val Ser Pro Arg Phe 215 220 225	787
gtc ata atc gac gac gga tgg cag tcc gtc gcc atg gac cct gtg gga Val Ile Ile Asp Asp Gly Trp Gln Ser Val Ala Met Asp Pro Val Gly 230 235 240	835
atc gct tgc cta tct gac aac tca gcc aac ttc gca aac agg ctg act Ile Ala Cys Leu Ser Asp Asn Ser Ala Asn Phe Ala Asn Arg Leu Thr 245 250 255 260	883
cac atc agg gag aac cac aag ttt cag aaa aat ggc agg gag ggt cac His Ile Arg Glu Asn His Lys Phe Gln Lys Asn Gly Arg Glu Gly His 265 270 275	931
agg gaa gat gac cca gcg aag ggc cta gca cac gtc gtc aat gag att Arg Glu Asp Asp Pro Ala Lys Gly Leu Ala His Val Val Asn Glu Ile 280 285 290	979
aag ggg aag cat cag ctg aag tat gtg tac gta tgg cat gcc atc acc Lys Gly Lys His Gln Leu Lys Tyr Val Tyr Val Trp His Ala Ile Thr 295 300 305	1027
gga tac tgg ggc gga gtg agg ccg ggt gca gct gga atg gag cac tac Gly Tyr Trp Gly Gly Val Arg Pro Gly Ala Ala Gly Met Glu His Tyr 310 315 320	1075
gga tca aag atg cag ccg ccc gtg cca tcg ccg ggg gtt cag aag aac Gly Ser Lys Met Gln Arg Pro Val Pro Ser Pro Gly Val Gln Lys Asn 325 330 335 340	1123
gag cgc tgc gac gcc ctg gac agc atg acg gcc aac ggg ctg ggc ctc Glu Arg Cys Asp Ala Leu Asp Ser Met Thr Ala Asn Gly Leu Gly Leu 345 350 355	1171
gtg aac cct gac agg gcg ttc agt ttc tac gac gag ctc cac tcg tac Val Asn Pro Asp Arg Ala Phe Ser Phe Tyr Asp Glu Leu His Ser Tyr 360 365 370	1219
ctc gcg tct gcc ggg atc gac ggg gtg aag gtg gac gtg cag aac gtc Leu Ala Ser Ala Gly Ile Asp Gly Val Lys Val Asp Val Gln Asn Val 375 380 385	1267
ctc gag acg ctg ggc gcc ggc cat ggc ggg agg gtg atg ctg gcg agg	1315

Leu	Glu	Thr	Leu	Gly	Ala	Gly	His	Gly	Gly	Arg	Val	Met	Leu	Ala	Arg	
390						395					400					
aag	tac	cag	cag	gct	ctg	gaa	gcg	tcc	gtc	gcc	agg	aac	ttc	cct	gac	1363
Lys	Tyr	Gln	Gln	Ala	Leu	Glu	Ala	Ser	Val	Ala	Arg	Asn	Phe	Pro	Asp	
405				410						415					420	
aat	ggc	atc	ata	tcg	tgc	atg	agc	cac	agc	acg	gac	aac	ttg	tac	agc	1411
Asn	Gly	Ile	Ile	Ser	Cys	Met	Ser	His	Ser	Thr	Asp	Asn	Leu	Tyr	Ser	
				425					430					435		
tcg	aaa	cgg	agc	gcg	gtg	att	aga	gcc	tct	gac	gat	ttc	tgg	ccg	aga	1459
Ser	Lys	Arg	Ser	Ala	Val	Ile	Arg	Ala	Ser	Asp	Asp	Phe	Trp	Pro	Arg	
			440					445					450			
gac	ccc	gct	tcc	cat	acc	ata	cac	gtc	gcg	tcc	gtc	gct	tat	aac	acc	1507
Asp	Pro	Ala	Ser	His	Thr	Ile	His	Val	Ala	Ser	Val	Ala	Tyr	Asn	Thr	
		455					460					465				
gtc	ttt	ctt	ggg	gag	ttc	atg	cag	cca	gac	tgg	gac	atg	ttc	cat	agt	1555
Val	Phe	Leu	Gly	Glu	Phe	Met	Gln	Pro	Asp	Trp	Asp	Met	Phe	His	Ser	
470						475					480					
gtt	cat	ccc	atg	gct	gag	tac	cat	gct	gcg	gct	cga	gcg	gtt	ggg	ggc	1603
Val	His	Pro	Met	Ala	Glu	Tyr	His	Ala	Ala	Ala	Arg	Ala	Val	Gly	Gly	
485					490				495						500	
tgt	gcc	ata	tat	gtc	agc	gac	aag	cct	ggg	agc	cat	gac	ttc	aat	ctg	1651
Cys	Ala	Ile	Tyr	Val	Ser	Asp	Lys	Pro	Gly	Ser	His	Asp	Phe	Asn	Leu	
				505					510					515		
ctc	aag	aag	ctc	gtg	ctt	ccc	gac	gga	tcg	atc	ctg	cgc	gca	aag	ctc	1699
Leu	Lys	Lys	Leu	Val	Leu	Pro	Asp	Gly	Ser	Ile	Leu	Arg	Ala	Lys	Leu	
			520					525					530			
ccc	ggg	agg	cca	acc	aga	gac	tgc	ctc	ttc	tct	gac	ccc	gca	agg	gac	1747
Pro	Gly	Arg	Pro	Thr	Arg	Asp	Cys	Leu	Phe	Ser	Asp	Pro	Ala	Arg	Asp	
		535					540					545				
ggc	aaa	agc	gtt	ctc	aag	ata	tgg	aac	ttg	aac	gaa	cac	tcc	ggc	gtc	1795
Gly	Lys	Ser	Val	Leu	Lys	Ile	Trp	Asn	Leu	Asn	Glu	His	Ser	Gly	Val	
550						555					560					
gtt	ggc	gcc	ttc	aac	tgc	caa	ggc	gcc	ggc	tgg	tgc	cgg	gta	gcc	aag	1843
Val	Gly	Ala	Phe	Asn	Cys	Gln	Gly	Ala	Gly	Trp	Cys	Arg	Val	Ala	Lys	
565					570				575						580	
aag	aac	ctc	atc	cac	gac	cag	cag	ccc	gga	acg	ttg	agc	ggc	gtc	atc	1891
Lys	Asn	Leu	Ile	His	Asp	Gln	Gln	Pro	Gly	Thr	Leu	Ser	Gly	Val	Ile	
				585					590					595		
cgg	gcg	cag	gac	gtg	gag	cac	ctt	gga	agg	gtg	gct	gat	cac	ggg	tgg	1939
Arg	Ala	Gln	Asp	Val	Glu	His	Leu	Gly	Arg	Val	Ala	Asp	His	Gly	Trp	
			600					605					610			
aac	ggc	gac	gtg	gtc	gtg	tat	ttg	cac	gtg	gga	ggg	gag	gtg	gtg	tac	1987
Asn	Gly	Asp	Val	Val	Val	Tyr	Leu	His	Val	Gly	Gly	Glu	Val	Val	Tyr	

615	620	625	
ctg ccg aag aac gcc ttg	ctg cct gtg acg ctg	aga tcg cgc gag tat	2035
Leu Pro Lys Asn Ala Leu	Leu Pro Val Thr Leu	Arg Ser Arg Glu Tyr	
630	635	640	
gag gtg ttc acc gtc gtc	cct ctc aag cac ctg	cca aac ggt acc tcc	2083
Glu Val Phe Thr Val Val	Pro Leu Lys His Leu	Pro Asn Gly Thr Ser	
645	650	655	660
ttt gcg gcg atc ggc ctt	ctc ggc atg ttc aac	tcc ggt ggc gcg gtg	2131
Phe Ala Ala Ile Gly Leu	Leu Gly Met Phe Asn	Ser Gly Gly Ala Val	
665	670	675	
agg gag ctg aga ttc ggt	ggt gag gat gcc gac	gtc gag ctc aga gtg	2179
Arg Glu Leu Arg Phe Gly	Gly Glu Asp Ala Asp	Val Glu Leu Arg Val	
680	685	690	
cgg ggc tcg ggc acg gtc	gga gct tat tcc tcg	acc aag cca acg tgt	2227
Arg Gly Ser Gly Thr Val	Gly Ala Tyr Ser Ser	Thr Lys Pro Thr Cys	
695	700	705	
gtc gcc gtc gat tcc aag	gcg gtt ggt ttc tcc	tac gat gcc acc tgt	2275
Val Ala Val Asp Ser Lys	Ala Val Gly Phe Ser	Tyr Asp Ala Thr Cys	
710	715	720	
ggc ctc atc agc ttc gag	ctc ggc att ccc gac	caa gaa atg tac ttg	2323
Gly Leu Ile Ser Phe Glu	Leu Gly Ile Pro Asp	Gln Glu Met Tyr Leu	
725	730	735	740
tgg acg gtt aca gta gag	tat tga agttacaact	gagaattgag atagattttc	2377
Trp Thr Val Thr Val Glu	Tyr		
745			
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Leu Gly Ala Lys Val	Leu Arg Glu Val	Arg Gly Asn Val	Leu Val Thr
20	25	30	
Pro Ala Ala Gly Gly	Gly Leu Thr Asn	Gly Ala Phe Leu	Gly Val Arg
35	40	45	

Ser Ala Pro Ala Ala Ser Arg Ser Ile Phe Pro Val Gly Lys Leu Arg
50 55 60

Asp Gln Arg Phe Val Cys Thr Phe Arg Phe Lys Met Trp Trp Met Thr
65 70 75 80

Gln Arg Met Gly Ser Ala Ser Arg Asp Ile Pro Ser Glu Thr Gln Phe
85 90 95

Leu Leu Val Glu Arg Ser Gly Gly Gly Glu Gln Pro Val Val Tyr Thr
100 105 110

Val Phe Leu Pro Val Leu Glu Gly Ser Phe Arg Ala Val Leu Gln Gly
115 120 125

Asn Ala Ala Asp Glu Leu Glu Ile Cys Leu Glu Ser Gly Asp Pro Asp
130 135 140

Val Glu Ser Phe Gln Gly Ser His Leu Val Phe Val Gly Ala Gly Ser
145 150 155 160

Asp Pro Phe Glu Val Ile Thr Ser Ser Val Lys Ala Val Glu Arg His
165 170 175

Leu Gln Thr Phe Ser His Arg Glu Lys Lys Lys Met Pro Asp Ile Leu
180 185 190

Asn Trp Phe Gly Trp Cys Thr Trp Asp Ala Phe Tyr Thr Asn Val Asn
195 200 205

Ala Gln Gly Val Lys Gln Gly Leu Gln Ser Leu Glu Lys Gly Gly Val
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Ser Pro Arg Phe Val Ile Ile Asp Asp Gly Trp Gln Ser Val Ala Met
225 230 235 240

Asp Pro Val Gly Ile Ala Cys Leu Ser Asp Asn Ser Ala Asn Phe Ala
245 250 255

Asn Arg Leu Thr His Ile Arg Glu Asn His Lys Phe Gln Lys Asn Gly
260 265 270

Arg Glu Gly His Arg Glu Asp Asp Pro Ala Lys Gly Leu Ala His Val
 275 280 285

Val Asn Glu Ile Lys Gly Lys His Gln Leu Lys Tyr Val Tyr Val Trp
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His Ala Ile Thr Gly Tyr Trp Gly Gly Val Arg Pro Gly Ala Ala Gly
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Met Glu His Tyr Gly Ser Lys Met Gln Arg Pro Val Pro Ser Pro Gly
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Val Gln Lys Asn Glu Arg Cys Asp Ala Leu Asp Ser Met Thr Ala Asn
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Gly Leu Gly Leu Val Asn Pro Asp Arg Ala Phe Ser Phe Tyr Asp Glu
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Leu His Ser Tyr Leu Ala Ser Ala Gly Ile Asp Gly Val Lys Val Asp
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Val Gln Asn Val Leu Glu Thr Leu Gly Ala Gly His Gly Gly Arg Val
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Met Leu Ala Arg Lys Tyr Gln Gln Ala Leu Glu Ala Ser Val Ala Arg
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Asn Phe Pro Asp Asn Gly Ile Ile Ser Cys Met Ser His Ser Thr Asp
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Asn Leu Tyr Ser Ser Lys Arg Ser Ala Val Ile Arg Ala Ser Asp Asp
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Phe Trp Pro Arg Asp Pro Ala Ser His Thr Ile His Val Ala Ser Val
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Ala Tyr Asn Thr Val Phe Leu Gly Glu Phe Met Gln Pro Asp Trp Asp
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Ala Val Gly Gly Cys Ala Ile Tyr Val Ser Asp Lys Pro Gly Ser His

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Asp	Phe	Asn	Leu	Leu	Lys	Lys	Leu	Val	Leu	Pro	Asp	Gly	Ser	Ile	Leu
		515					520					525			
Arg	Ala	Lys	Leu	Pro	Gly	Arg	Pro	Thr	Arg	Asp	Cys	Leu	Phe	Ser	Asp
	530					535					540				
Pro	Ala	Arg	Asp	Gly	Lys	Ser	Val	Leu	Lys	Ile	Trp	Asn	Leu	Asn	Glu
545					550					555					560
His	Ser	Gly	Val	Val	Gly	Ala	Phe	Asn	Cys	Gln	Gly	Ala	Gly	Trp	Cys
			565						570					575	
Arg	Val	Ala	Lys	Lys	Asn	Leu	Ile	His	Asp	Gln	Gln	Pro	Gly	Thr	Leu
			580					585					590		
Ser	Gly	Val	Ile	Arg	Ala	Gln	Asp	Val	Glu	His	Leu	Gly	Arg	Val	Ala
		595					600					605			
Asp	His	Gly	Trp	Asn	Gly	Asp	Val	Val	Val	Tyr	Leu	His	Val	Gly	Gly
	610					615					620				
Glu	Val	Val	Tyr	Leu	Pro	Lys	Asn	Ala	Leu	Leu	Pro	Val	Thr	Leu	Arg
625					630					635					640
Ser	Arg	Glu	Tyr	Glu	Val	Phe	Thr	Val	Val	Pro	Leu	Lys	His	Leu	Pro
				645					650					655	
Asn	Gly	Thr	Ser	Phe	Ala	Ala	Ile	Gly	Leu	Leu	Gly	Met	Phe	Asn	Ser
			660					665						670	
Gly	Gly	Ala	Val	Arg	Glu	Leu	Arg	Phe	Gly	Gly	Glu	Asp	Ala	Asp	Val
		675					680					685			
Glu	Leu	Arg	Val	Arg	Gly	Ser	Gly	Thr	Val	Gly	Ala	Tyr	Ser	Ser	Thr
	690					695					700				
Lys	Pro	Thr	Cys	Val	Ala	Val	Asp	Ser	Lys	Ala	Val	Gly	Phe	Ser	Tyr
705					710					715					720
Asp	Ala	Thr	Cys	Gly	Leu	Ile	Ser	Phe	Glu	Leu	Gly	Ile	Pro	Asp	Gln
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